

Cihan University Sulaymaniya
Faculty of Engineering
Architectural Engineering Department



Building Materials

Chapter Four (Masonry Work) (3-Stone Work & Masonry Joints)

1st Grade- Fall Semester 2022-2023

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Masonry work

Stone masonry work

Natural stone is durable but expensive and it is used today mainly as a facing material, predominantly as a relatively thin layer fixed to a solid background of other materials.

In addition to **the high cost of worked stone the cost of site labor** in the erection of solid walling is considerable, especially in rubblework, so that the structural use of stone tends to be limited mainly to the **outer leaf of cavity walling** in areas where it can be supplied economically for this purpose from local quarries.

Masonry work

Stone masonry work

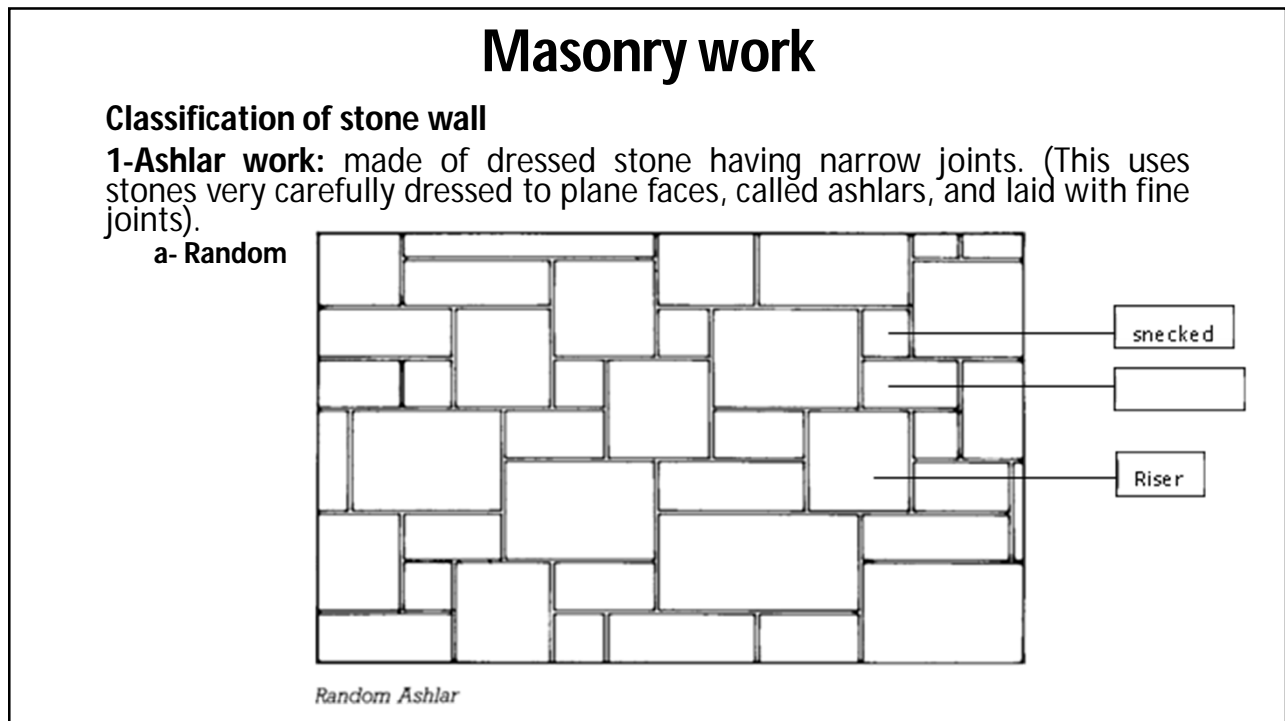
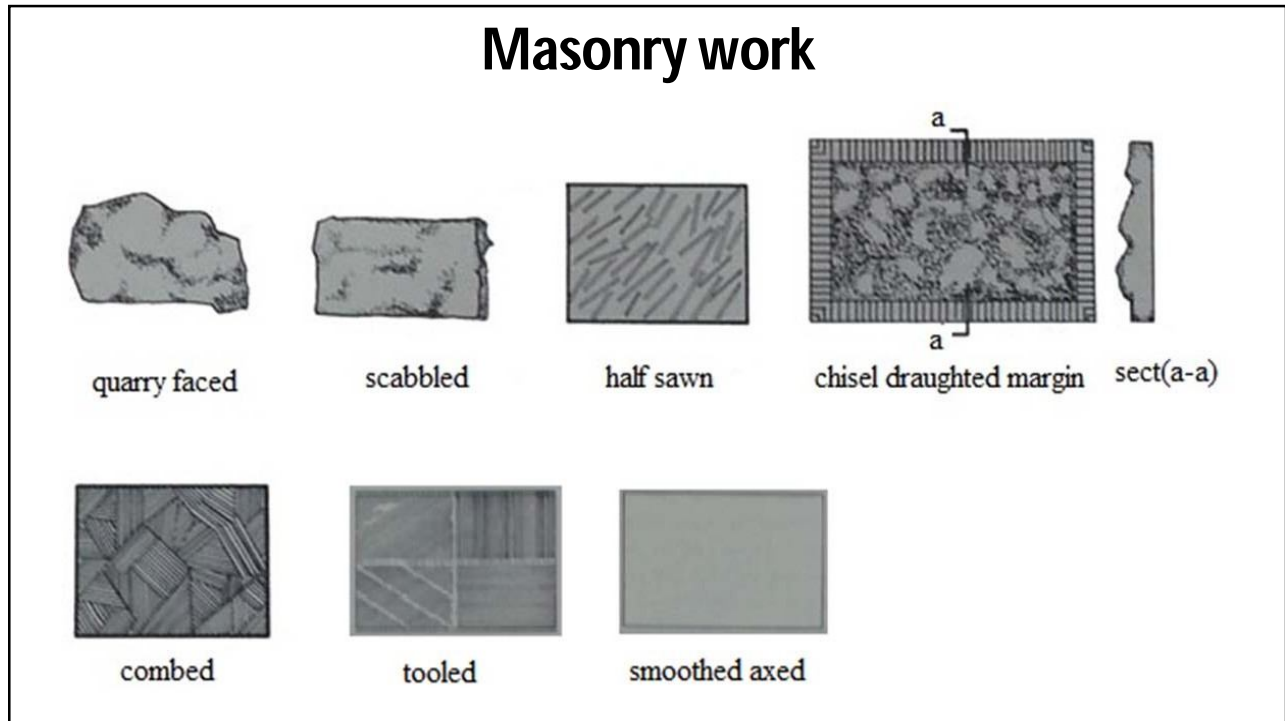
- Plastering costs are high with rubble walling because of the uneven surface of the stonework and half-brick internal lining to solid rubble work have been used to produce a smoother face and reduce costs.
- However, tests have shown that even the traditional 406mm stone wall will permit some rain penetration except in very sheltered positions so that solid wall construction is now generally avoided, for this reason as well as for reasons of economy in construction costs.

Masonry work

Stone masonry work

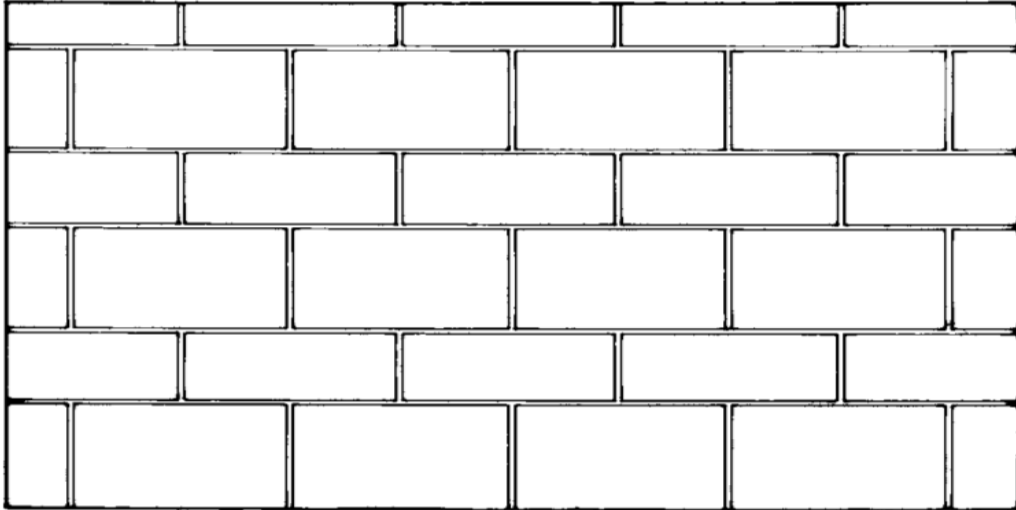
Stone preparation:

- 1-self-faced or quarry faced
- 2-scabbled
- 3-half sawn
- 4-chisel draught margin
- 5-plain work
 - a- combed
 - b- tooled
 - c- smoothed axed



Masonry work

b- Coursed ashlar



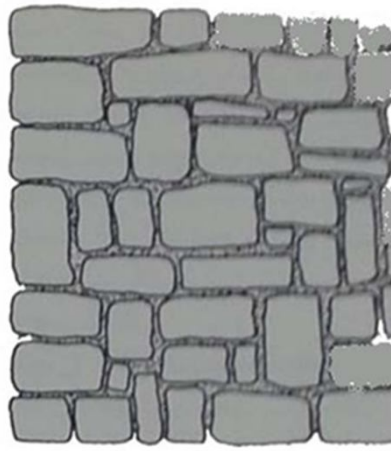
Coursed Ashlar

Masonry work

2-Rubble work: made of stones undressed or roughly dressed having wide joint. (This uses stones either as they come from the quarry or only roughly dressed to shape).

a- Random rubble

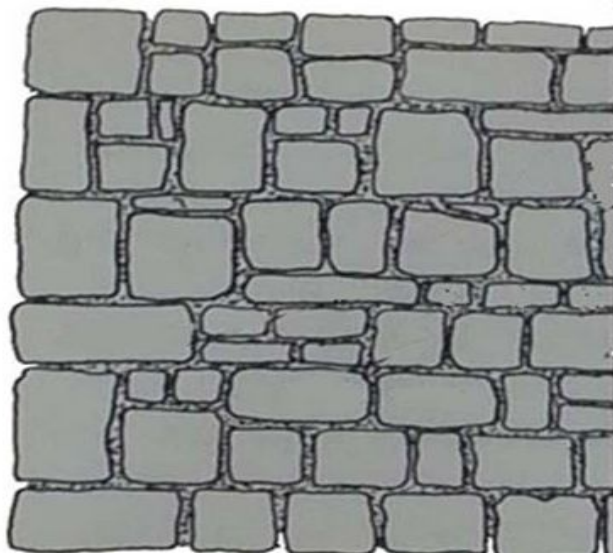
a-1- Uncoursed



Uncoursed

Masonry work

a-2- Brought to courses

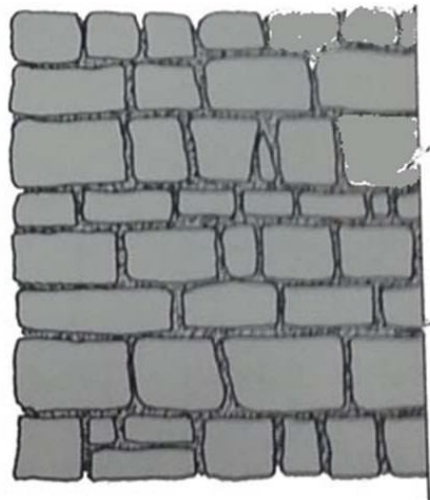


Masonry work

a-3-Coursed



coursed



coursed

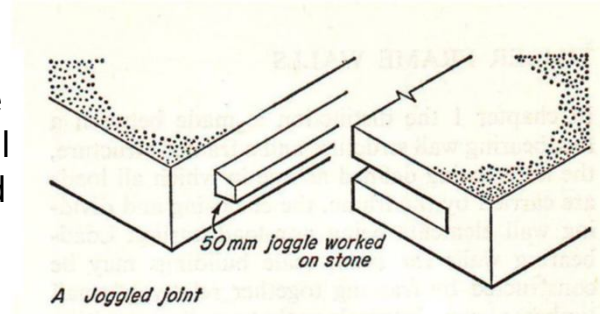
Masonry work

Joints and connections of stone work

Adjacent stones in a course, or stones in adjacent courses, may be connected by means of **joggles** and **cramps** to prevent relative movement between the stones.

Forms of joggles joints as shown below:-

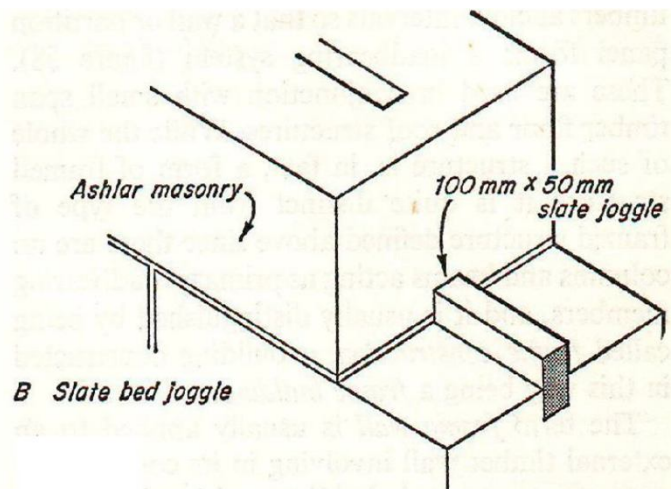
A joggles as at (A) prevents vertical displacement of one stone relative to the other. Joggles in bed joints prevent lateral displacement of stones in walls subjected to side pressure.



Masonry work

Joints and connections of stone work

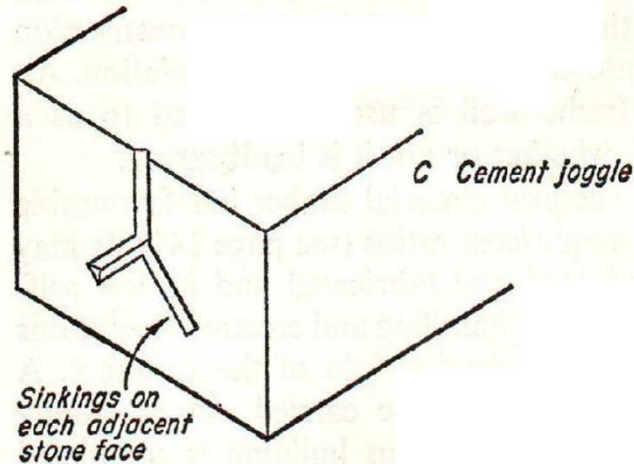
These may be cut in the actual stones or formed as slate joggles (B) which is cheaper.



Masonry work

Joints and connections of stone work

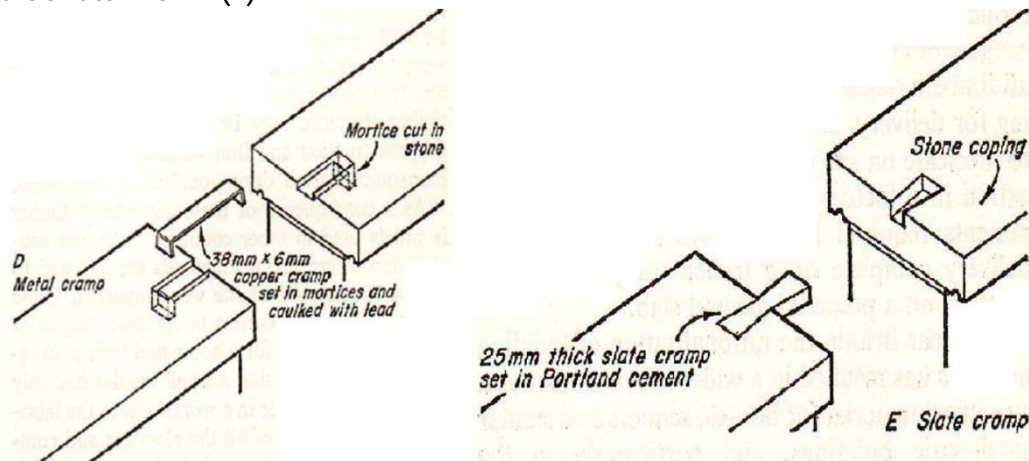
Cement joggles (C), formed by filling with mortar grout the V-shape sinkings in adjacent stones, are so shaped to prevent both vertical and lateral movement.



Masonry work

Joints and connections of stone work

Cramps are used to prevent adjacent stones coming apart, particularly coping stones. These may be of metal which should be a non-corrosive metal to avoid spalling of the stone due to rusting of the metal (D), or of slate cut to a dovetail form (E).



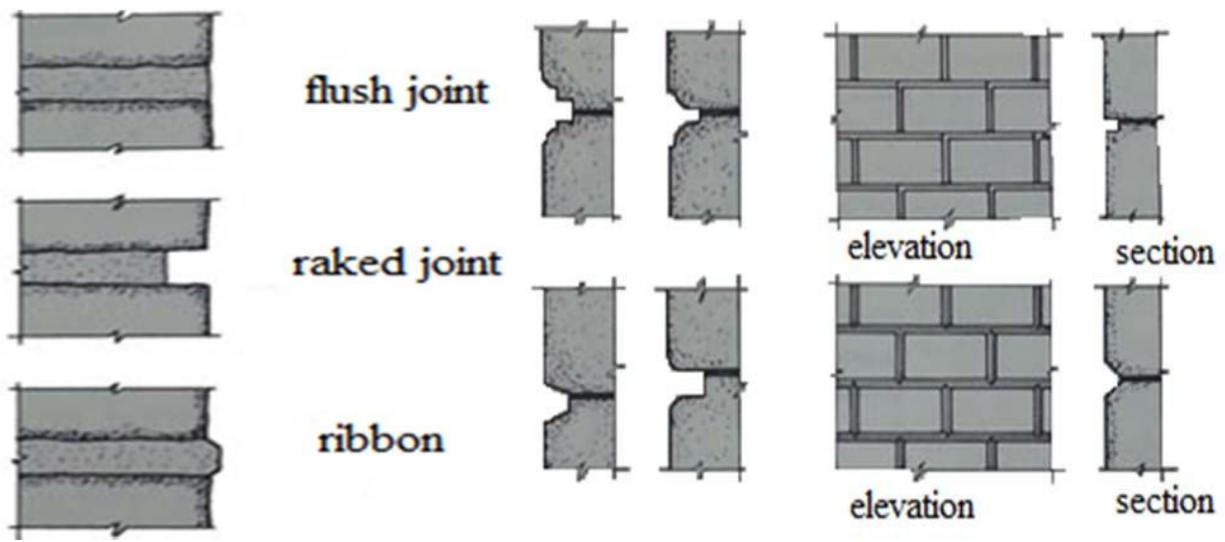
Masonry work

Mortar

- Mortars for stonework should be plastic enough to permit the stones to bed down equally.
- Mixes fulfilling these requirements consist of finely crushed stone, lime and a very small proportion of Portland cement.
- Many stone suppliers recommend, or supply ready-mixed, specific mortar mixes for their stones.

Masonry work

Stone joint



Brick Joints

- ✚ WEATHERED
- ✚ CONCAVE
- ✚ VEE
- ✚ FLUSH
- ✚ RAKED
- ✚ STRIPPED
- ✚ STRUCK

Masonry work

Brick Joint

Weathered joint

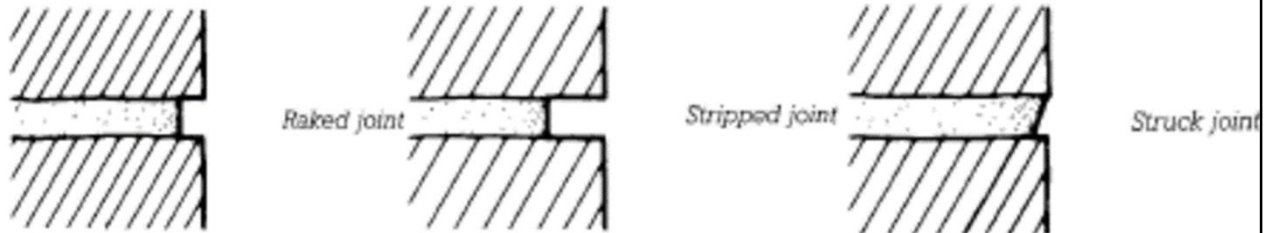
Concave joint

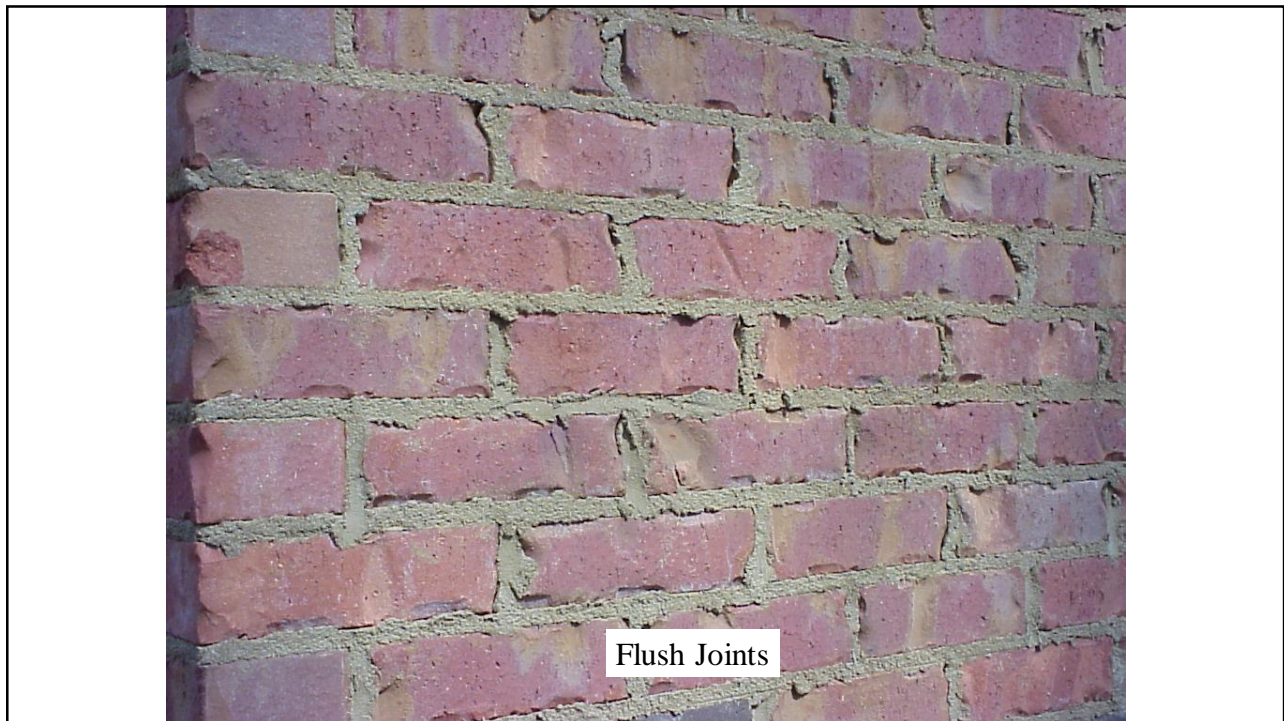
Vee joint

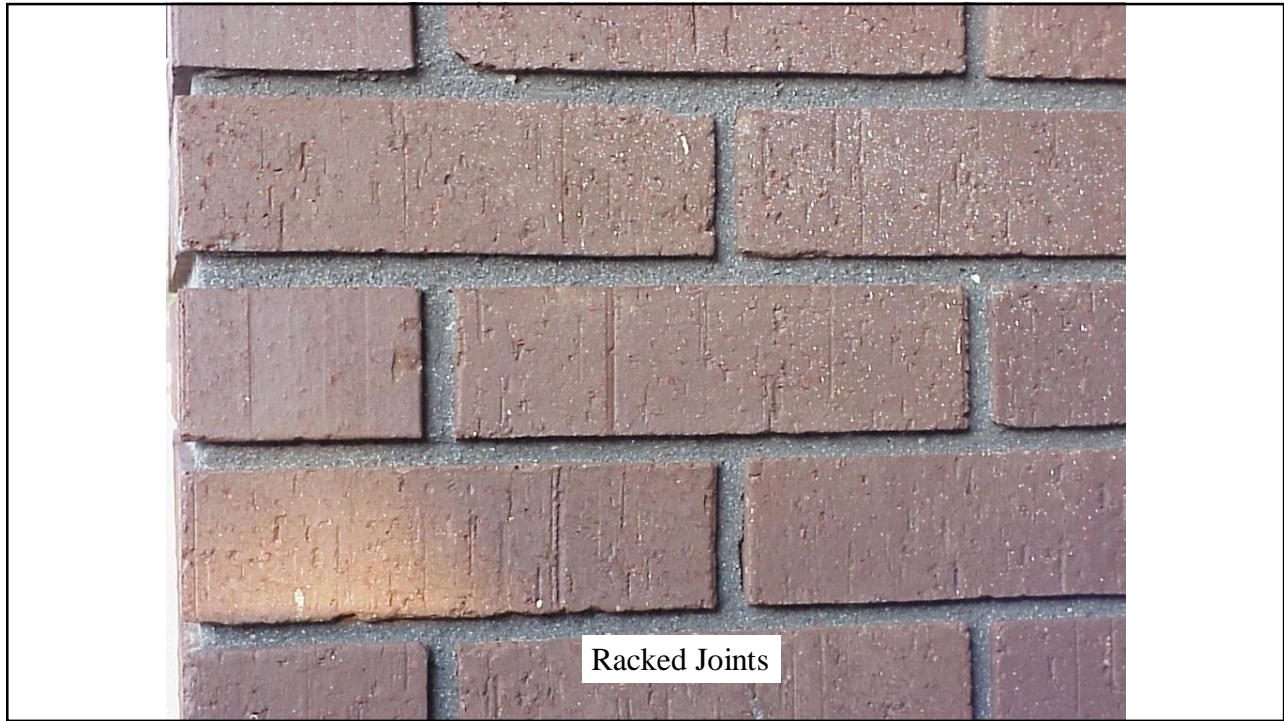
Flush joint

Masonry work

Brick Joint







Spanning Masonry Openings

- Lintels
 - Purpose
 - Materials
 - Reinforced Concrete
 - Reinforced Brick
 - Steel Angles
- Arches



Thank You